

# How women with intimate partner violence (IPV) reason about other's intentions: effect of IPV on counterfactual inferences among healthy high socioeconomic level women from Turkey

AHMET GUL<sup>1</sup>, HESNA GUL<sup>2</sup>

<sup>1</sup> Department of Psychiatry, Ufuk University School of Medicine, Ankara, Turkey.

<sup>2</sup> Department of Child and Adolescent Psychiatry, Gulhane Research and Training Hospital, Ankara, Turkey.

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## Abstract

**Background:** Counterfactual thinking (CFT) is a specific type of human thought involving mental representations of alternatives to past situations by perceiving the immediate environment from an imagined perspective. CFT problems and deficits in counterfactual inference ability are related to psychopathologies. **Objective:** We aimed to assess the CFT in a sample of high sociocultural-healthy women with and without intimate partner violence (IPV) exposure to determine whether exposure to different types of IPV has effects on CFT. **Methods:** Three hundred thirty-six women recruited the study. Data was collected by Violence Exposure Questionnaire and Counterfactual Inference Test. **Results:** Compared with non-victims, physical IPV victims significantly generate fewer counterfactual thoughts when faced with a simulated scenario. In addition, the reaction of rumination (judgemental) in response to a temporal nearly happened event was significantly lower among both physical and emotional IPV victims. Among victims, deficits in the CIT is positively correlated with the number of physical, emotional and economic abuses but the degree of correlations were weak. **Discussion:** We demonstrated that IPV exposure is severe in healthy women at the high socioeconomic level and is associated with the decrease in CFT ability.

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**Keywords:** Intimate partner violence, counterfactual thinking, counterfactual inference, women mental health.

## Introduction

Counterfactual thinking (CFT) is a specific type of human thought involving mental representations of alternatives to past situations by perceiving the immediate environment to an imagined perspective<sup>1,2</sup>. These representations play a crucial role by providing the basis for learning from past experiences, supporting adaptive behavior, enable planning and predicting) for the future, modulating emotions and social attributions<sup>1,3-6</sup>. CFT process is mainly activated by negative outcomes of the lives in the form of “if only” conditional prepositions<sup>7</sup>. For example, in the fictional scenario where you have failed in an exam, a counterfactual thought like if only I had worked harder, I would have passed the exam might be automatically generated.

The counterfactual thinking appears to be a constructive process that requires of the integration of different cognitive functions and psychological processes which depend on an integrative network of systems for effective processing, mental simulation, and cognitive control, including cortical and subcortical structures<sup>1,8,9</sup>. Counterfactual inference is a part of CFT. There are many studies that had been linked counterfactual thinking problems and deficits in counterfactual inference ability with psychopathologies including depression<sup>10-13</sup>, schizophrenia<sup>14,15</sup>, gambling behavior<sup>13,16</sup>, posttraumatic stress disorder-other trauma-related conditions<sup>9,13,17</sup> and obsessive-compulsive disorder<sup>18</sup>, which are also related to cortical-subcortical region dysfunctions. On the other hand, research on the problems which are subclinical but could have an effect on cognition and CFT are still scarce. One of the most common problems in this category is exposure to violence. Studies demonstrated that many types of violence (i.e., childhood maltreatment, domestic violence, intimate partner violence, violence towards the child) are related with the cortical-subcortical dysfunctions<sup>19-23</sup> that may lead CFT problems. With this objective in mind, we aimed to assess the CFT in a sample of high sociocultural-healthy women with and without intimate partner violence (IPV) exposure. Our hypothesis were:

- Women with IPV exposure will present a poorer performance on CIT even if a psychiatric symptom is not observed and the sociocultural level is high;
- Exposure to different types of IPV has different effects on CIT.

## Materials and methods

### Study design

This cross-sectional study was conducted in the Psychiatry Department of Ufuk University Hospital, Ankara, Turkey. The Clinical Research Ethics Committee of our hospital approved the study procedures. All subjects gave written and/or online informed consent before inclusion.

### Participants

Three hundred thirty-six participants were recruited from the health workers and the mothers of children who were referred to the outpatient services of pediatric health units in Ufuk University. The inclusion criterion was: being at least high school graduate, being still married and having at least one child. Exclusion criterion was: a history of trauma involving loss of consciousness, an organic or psychiatric disease with mental repercussions or an estimated intelligence (IQ) below 70. The average age of the women was 36.14 ± 8.23 years, monthly income level was 5,235 ± 3,852 Turkish Liras, the average duration of education was 16.0 ± 2.2 years, and the mean marriage time was 10.36 ± 8.8 years.

## Materials

### Violence Exposure Questionnaire

This questionnaire was prepared with the aim of determining whether participants had experienced physical violence, emotional violence,

economic violence and sexual violence by their husbands. Questions prepared with this aim separately defined the types of violence, stating the encompassed behavior and attitudes in detail, and requested the participants to state how many times they had experienced these types of violence during the length of their marriage as best they can remember. The questions were as follows:

- For physical violence: Has your husband ever applied physical violence to you until you married? If so, how many times? If you have not, please answer “0” to this question. (“Physical violence” includes all hurtful physical behaviors such as slapping, throwing something, hitting, dragging, tattooing, squeezing your throat etc.).
- For emotional violence: Has your husband ever applied emotional violence to you until you married? If so, how many times? If you have not, please answer “0” to this question. (Emotional violence includes insulting, swearing, humiliation, threaten with harm etc.).
- For economic violence: Has your husband ever applied economic violence to you until you married? If so, how many times? If you have not, please answer “0” to this question. Economic violence includes the behaviors such as preventing or forcing you to leave work, not giving enough money for your, home’s and children’s needs, and getting your own money by force if any etc.).
- For sexual violence: Has your husband ever applied sexual violence to you until you married? If so, how many times? If you have not, please answer “0” to this question. (Sexual violence includes the behaviors of enforcement the sexual intercourse, hurtful sexual behaviors, do not find attractive and humiliation etc.).
- For physical abuse to their child: Do you apply physical violence (beating or hurting) to your child when you are angry with your husband due to his behaviors?
- For emotional abuse to their child: Do you apply emotional violence (shouting, humiliating etc.) to your child when you are angry with your husband due to his behaviors?

### Demographic information form

We prepared this online form to obtain information about demographic characteristics (age, education, personal monthly income, duration of marriage) of the participants.

### Counterfactual Inference Test (CIT)

This form originally designed by Hooker *et al.*<sup>24</sup> and was administered to assess the ability to generate counterfactual-derived inferences in front of different hypothetical social situations. The CIT presents a set of four scenarios. In these scenarios, two different individuals experienced two events with similar outcomes, but events differ such that one of the individuals should think “if only” to a greater extent than the other does. This self-reporting instrument is based on previous research which has shown how specific characteristics of the situation might influence the generation of an inference by enhancing CFT, events that seem “almost” (either spatially or temporally) to have occurred and how CFT once activated, can influence the individual’s effective and judgmental reactions to the situation<sup>25</sup>.

Scenario 1 is: “Janet is attacked by a mugger only 10 m from her house. Susan is attacked by a mugger 1 kilometer from her house. Who is more upset about the mugging?” Responses are: a) Janet, b) Susan, c) Same/Can’t tell. The expected answer is Janet. This scenario focuses on general affective reaction “upset” in the context of a spatial “nearly happened” event.

Scenario 2 is: “Anna gets sick after eating at a restaurant she often visits. Sarah gets sick after eating at a restaurant she has never visited before. Who regrets their choice of restaurant more?” Responses are: a) Anna, b) Sarah, c) Same/Can’t tell. The expected answer is Sarah. This scenario focuses on the reaction of regret (affective) in response to an ‘unusual’ event.

Scenario 3 is: “Jack misses his train by five minutes. Ed misses his train by more than an hour. Who spends more time thinking about the missed train?” Responses are: a) Ed, b) Jack, c) Same/Can’t tell. The expected answer is Jack. This scenario focuses on the reaction of rumination (judgemental) in response to a temporal “nearly happened” event.

Scenario 4 is: “John gets into a car accident while driving on his usual way home. Bob gets into a car accident while trying a new way home. Who thinks more about how his accident could have been avoided?” Responses are: a) Bob, b) John, c) Same/Can’t tell. The expected answer is Bob. This scenario focuses the on reaction of avoidance (judgemental) in response to an “unusual” event.

The CIT total score is calculated from the typical/normative pattern of responses, based on previous research using a sample of undergraduate control subjects<sup>24</sup>. Each scenario is given a maximum score of 1 if the subject chooses the normative response, that is the target answer, if the subject chooses other answers, the score assigned as zero. So, the total score ranges between 0 and 4, with higher values indicating the normative pattern.

### Statistical analysis

Statistical analysis was performed using the SPSS software version 18. The frequency of participants with IPV victims or non-victims were presented by other variables using cross-tabulations. The Chi-square test or Fisher’s exact test where appropriate, was used to compare these proportions in different groups. Normality testing of data was performed with Shapiro Wilk’s test. Descriptive analyses were presented using means and standard deviations for normally distributed ones. Since the parameters used in this study were normally distributed, the Student’s t-test was used to compare the differences between groups. A p value of less than 0.05 was considered to show a statistically significant result.

### Results

Three hundred and thirty-six women accepted to participate in the study. The mean age of these women was  $36.14 \pm 8.23$  years, with mean monthly income level  $5,235 \pm 3,852$  Turkish Lira, mean educational duration of  $16.0 \pm 2.2$  years and mean marriage duration of  $10.36 \pm 8.8$  years (Table 1).

**Results in terms of physical IPV:** We found that 64 (19%) of these women had been exposed to physical violence at least once by their husbands. In the group exposed to violence age and duration of marriage were significantly higher ( $p < 0.001$ ), and year of education, monthly income and CIT scale scores were significantly lower ( $p < 0.001$ ,  $p = 0.002$  and  $p = 0.003$ , respectively) compared to the group with no exposure. Of women exposed to physical violence, 53.1% had been physically violent toward their own children, and 96.9% had been emotionally violent (Table 2). The rates of target responses were significantly lower in scenario 3 and 4 among physical IPV victims than non-victims (Table 3). The correlation between CIT scores and numbers of physical abuse was negatively significant but weak (correlation is significant at the 0.01 level -2-tailed; and the Pearson correlation coefficient: -0.21).

**Table 1.** Sociodemographic features

Variables	N = 336	
	Mean $\pm$ SD	Min-Max
<b>Age (year);</b>	36.14 $\pm$ 8.23	25-63
<b>Socioeconomical parameters</b>		
• Monthly Income (Turkish Liras)	5,235 $\pm$ 3,852	0-20.000
• Total Education Time (year)	16.0 $\pm$ 2.2	11-19
• Total Marriage Time (year)	10.36 $\pm$ 8.8	1-36

**Table 2.** Distribution of sociodemographic characteristics and scale scores according to IPV types

	Physical IPV			Emotional IPV			Economic IPV			Sexual IPV		
	(Victims)	(Non-victims)	Statistics, and p value	(Victims)	(Non-victims)	Statistics, and p value	(Victims)	(Non-victims)	Statistics, and p value	(Victims)	(Non-Victims)	Statistics, and p value
Ratio	64 (% 19)	272 (% 81)		152 (% 45.2)	184 (% 54.8)		42 (% 12.5)	294 (% 87.5)		20 (% 6)	316 (% 94)	
Age (year)	38.7 ± 9.0	35.5 ± 7.9	t = -2.88, p = 0.004	35.3 ± 7.9	36.7 ± 8.4	t = 1.57, p = 0.117	42.5 ± 9.7	35.2 ± 7.5	t = -5.61, p < 0.001	37.0 ± 9.55	36.08 ± 8.15	t = -0.47, p = 0.632
Education time (year)	15.06 ± 2.28	16.26 ± 2.20	t = -3.90, p < 0.001	15.83 ± 2.32	16.20 ± 2.21	t = 1.49, p = 0.136	13.95 ± 2.17	16.33 ± 2.12	t = 6.78, p < 0.001	15.00 ± 2.33	16.10 ± 2.25	t = 2.12, p = 0.03
Marriage time (year)	14.18 ± 9.67	9.45 ± 8.46	t = -3.90, p < 0.001	10.07 ± 8.98	10.59 ± 8.82	t = 0.59, p = 0.590	17.19 ± 10.0	9.38 ± 8.27	t = -5.50, p < 0.001	10.75 ± 9.54	10.33 ± 8.86	t = -0.20, p = 0.840
Personal monthly income	3,903 ± 4,278	5,549 ± 3,684	t = 3.11, p = 0.002	5,107 ± 4,164	5,341 ± 3,582	t = 0.55, p = 0.581	3,252 ± 2,901	5,519 ± 3,891	t = 3.61, p < 0.001	3,550 ± 1,944	5,342 ± 3,919	t = 2.02, p = 0.04
Physical violence towards her own child	34 (%53.1)	92 (%33.8)	$\chi^2 = 8.23$ , p = 0.004	66 (%43.4)	60 (%32.6)	$\chi^2 = 4.15$ , p = 0.02	20 (%47.6)	106 (%36.1)	$\chi^2 = 2.09$ , p = 0.102	10 (%50)	116 (%92.1)	$\chi^2 = 1.41$ , p = 0.170
Emotional violence towards her own child	62 (%96.9)	238 (%87.5)	$\chi^2 = 4.76$ , p = 0.017	136 (%89.5)	164 (%89.1)	$\chi^2 = 0.01$ , p = 0.532	40 (%95.2)	260 (%88.4)	$\chi^2 = 1.77$ , p = 0.140	18 (%90)	282 (%89.2)	$\chi^2 = 0.01$ , p = 0.636

**Table 3.** Distribution of CIT scale scores and response to scenarios according to IPV types

	Physical IPV			Emotional IPV			Economic IPV			Sexual IPV		
	Victims (64)	Non-victims (272)	Statistics, and p value	Victims (152)	Non-victims (184)	Statistics, and p value	Victims (42)	Non-victims (294)	Statistics, and p value	Victims (20)	Non-victims (316)	Statistics, and p value
• CIT total score	2.12 ± 1.09	2.54 ± 0.98	t = 2.99, p = 0.003	2.38 ± 1.05	2.53 ± 0.98	t = 1.33, p = 0.177	2.28 ± 1.17	2.48 ± 0.99	t = 1.21, p = 0.225	2.50 ± 1.14	2.46 ± 1.01	t = -0.87, p = 0.872
• <b>Scenario 1</b>			$\chi^2 = 5.21$ , p = 0.07			$\chi^2 = 1.45$ , p = 0.48			$\chi^2 = 0.80$ , p = 0.66			$\chi^2 = 3.14$ , p = 0.020
• TCFT	14 (%21.9)	80 (29.4)		38 (%25)	56 (30.4)		12 (%28.6)	82 (27.9)		4 (%20)	90 (28.5)	
• N-TCFT	2 (%3.1)	26 (%9.6)		12 (%7.9)	16 (%8.7)		2 (%4.8)	26 (%8.8)		0 (%0)	28 (%8.9)	
• Same/can't tell	48 (%75)	166 (%61.0)		102 (%67.1)	112 (%60.9)		28 (%66.7)	186 (%63.3)		16 (%80)	198 (%62.7)	
• <b>Scenario 2</b>			$\chi^2 = 2.26$ , p = 0.32			$\chi^2 = 1.32$ , p = 0.51			$\chi^2 = 1.59$ , p = 0.45			$\chi^2 = 1.33$ , p = 0.51
• TCFT	32 (%50)	164 (%60.3)		84 (%55.3)	112 (%60.9)		22 (%52.4)	174 (%59.2)		12 (%60)	184 (%58.2)	
• N-TCFT	22 (%34.4)	74 (%27.2)		48 (%31.6)	48 (%26.1)		12 (%28.6)	74 (%28.6)		4 (%20)	92 (%29.1)	
• Same/can't tell	10 (%15.6)	34 (%12.5)		20 (%13.2)	24 (%13.0)		8 (%19.0)	36 (%12.2)		4 (%20)	40 (%12.7)	
• <b>Scenario 3</b>			$\chi^2 = 6.98$ , p = 0.03			$\chi^2 = 6.54$ , p = 0.03			$\chi^2 = 2.97$ , p = 0.22			$\chi^2 = 5.17$ , p = 0.75
• TCFT	52 (%81.3)	244 (%89.7)		128 (%84.2)	168 (%91.3)		34 (%81.0)	262 (%89.1)		16 (%80)	280 (%88.6)	
• N-TCFT	2 (%3.1)	12 (%4.4)		6 (%3.9)	8 (%4.3)		2 (%4.8)	12 (%4.1)		0 (%0)	14 (%4.4)	
• Same/can't tell	10 (%15.6)	16 (%5.9)		18 (%11.8)	8 (%4.3)		6 (%14.3)	20 (%6.8)		4 (%20)	22 (%7)	
• <b>Scenario 4</b>												
• TCFT	38 (%59.4)	204 (%75)	$\chi^2 = 6.59$ , p = 0.03	112 (%73.7)	130 (%70.7)	$\chi^2 = 1.93$ , p = 0.37	28 (%66.7)	24 (%72.8)	$\chi^2 = 2.34$ , p = 0.31	18 (%90)	224 (%70.9)	$\chi^2 = 3.97$ , p = 0.13
• N-TCFT	10 (%15.6)	30 (%11)		20 (%13.2)	20 (%10.9)		8 (%19)	32 (%10.9)		0 (%0)	40 (%12.7)	
• Same/can't tell	16 (%25)	38 (%14)		20 (%13.2)	34 (%18.5)		6 (%14.3)	48 (%16.3)		2 (%10)	52 (%16.5)	

**Scenario 1:** upset in spatial "nearly happened" event. **Scenario 2:** regret in unusual event. **Scenario 3:** Rumination in temporal "nearly happened" event. **Scenario 4:** judgements of avoidance in unusual event. **TCFT:** target counterfactual response. **N-TCFT:** non-target counterfactual response.

**Results in terms of emotional IPV:** We found that 152 (45.2%) of the women had been exposed to emotional violence by their husband at least once. In the group exposed to emotional violence, the age, marital duration, educational duration and monthly income were lower compared to the group not exposed to emotional violence; however, these differences were not identified to be significant in terms of statistics (Table 2). There was not a significant difference according to CIT scores and scenarios, except scenario 3, between emotional IPV victims and Non-victims (Table 3). The correlation

between CIT scores and numbers of emotional abuse was negatively significant but weak (correlation is significant at the 0.01 level -2-tailed; and the Pearson correlation coefficient: -0.13).

**Results in terms of economic IPV:** We found that 42 (12.5%) of women were exposed to this type of IPV at least once during their marriage. These women were determined to have significantly higher age and marriage durations ( $p < 0.001$ ) and lower monthly income and educational levels ( $p < 0.001$ ). There was no significant difference in any of scenarios and CIT total scores between women exposed

to economical IPV and those not exposed to it (Tables 2 and 3). The correlation between CIT scores and numbers of economical abuse was negatively significant but weak (correlation is significant at the 0.01 level -2-tailed; and the Pearson correlation coefficient: -0.17).

**Results in terms of sexual IPV:** Finally, we found that exposure to sexual violence was 6% among this group. Among the women exposed to sexual violence, the educational levels and monthly income were significantly lower (Table 2). The correlation between CIT scores and numbers of physical abuse was positively significant but weak (correlation is significant at the 0.01 level -2-tailed; and the Pearson correlation coefficient: 0.11).

## Discussion

Our study demonstrated the first results about the relationship between counterfactual inference and intimate partner violence in a healthy/high socioeconomic women group. As a result, the main finding of the study is that, compared with non-victims, physical IPV victims significantly generate fewer counterfactual thoughts when faced with a simulated scenario. In addition, the reaction of rumination (judgemental) in response to a temporal nearly happened event was significantly lower among both physical and emotional IPV victims. Among victims, deficits in the CIT is positively correlated with the number of physical, emotional economical abuses but the degree of correlations were weak.

Counterfactual thoughts are mental representations of alternatives to past events which is linked to effective problem solving and decision-making. Compared to what is normally expected in the general population, women who exposed to physical IPV seem to generate significantly fewer spontaneous alternative representations using CIT in the face of a fictional situation with a negative outcome. These findings reinforce the hypothesis that trauma is a mental condition in which victims have difficulties in using conditional reasoning and have revictimization risk<sup>26</sup>. Interestingly our data analyses also reveal lower counterfactually derive inferences ability of "ruminations in temporal nearly happened event" in physical and emotional IPV victims. Whereas from a clinical point of view this general reaction might be associated with the relationship between psychopathologies and physical-emotional IPV. As known both physical and psychological IPV are associated with mental health consequences for victims<sup>27</sup> and rumination is one of the most important basic components of traumas' influence on mental health<sup>28</sup>. Although it is not possible to evaluate causality in a cross-sectional study like the present one, it can be speculated that physical and emotional IPV might be associated with bizarre ruminations that preventing the necessary precautions. In a study, the role of rumination in elevating perceived stress among female survivors of interpersonal violence with PTSD was examined. Results of this study indicated that perceived stress mediates the relationship between rumination and PTSD, but did not do so after controlling for depression<sup>29</sup>. These results seem to support our interpretation because our group consists of healthy women even if they had been abused by their husbands and deficits in counterfactual thinking, specifically in the rumination style could be a coping strategy with the effects of violence. In addition, deficits in CIT is positively correlated with the number of physical, emotional and economic abuse. Consistently, in a study with a sample of assault victims, frequency of CFT found to be closely associated with continuing levels of PTSD<sup>30</sup>. It could be possible that this relationship may eventually result in the appearance of psychopathologies after the cumulative effects of traumas. These possibilities need to be addressed again in larger samples.

Our study has some limitations. The relatively small size of the group, the use of only a survey and self-reported scale for data collection, cross-sectional study design so could not determinate the effects of abuse processes on CFT (e.g., processes related to early years of marriage or later years) are the important limitations of the study. In addition, it should be noted that the total score of 2.5/4 found in non-victims is not consistent with the normative pattern proposed by Hooker *et al.* and is consistent with the low CIT scores

in the healthy group of Albacete *et al.*'s study<sup>14,24</sup>. On the other hand, we demonstrated that IPV exposure is also severe in women at the high socioeconomic level and is associated with the decrease in CFT ability, which is a sign of cortical-subcortical functions. We hope future studies will access necessary information to prevent violence towards women and children with more detailed measurements and analyses.

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## Disclosure

We have no conflict of interest to declare. This study was conducted at Ufuk University, School of medicine Hospital.

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